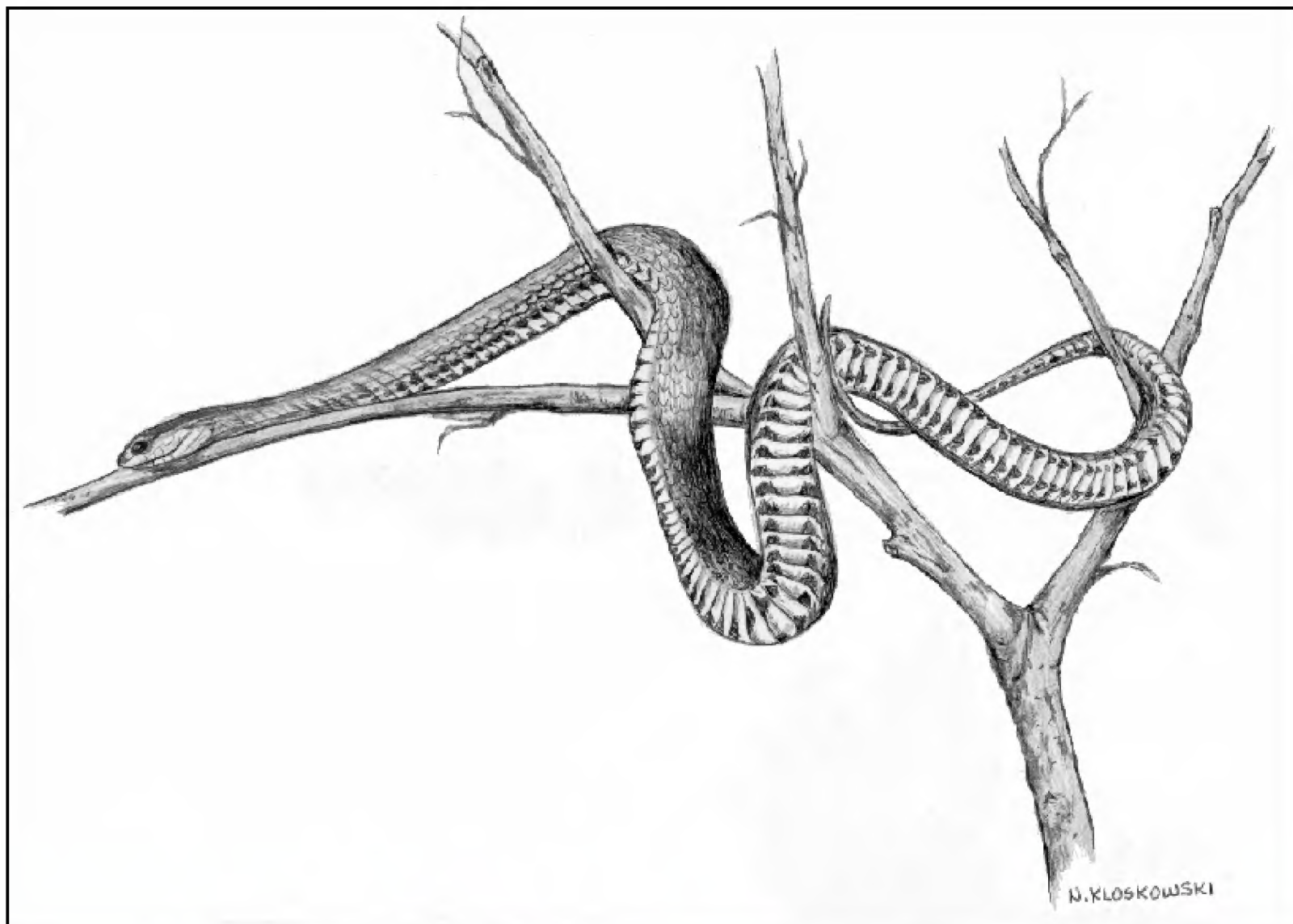

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BULLETIN OF THE CHICAGO HERPETOLOGICAL SOCIETY

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Notes on the Herpetofauna of Western Mexico 1: An Update on the Herpetofauna of the State of Jalisco, Mexico

Daniel Cruz-Sáenz¹, Sergio Guerrero¹, David Lazcano² and Jorge Téllez-López³

Abstract

To update the herpetological species list for the state of Jalisco, we searched for amphibian and reptile specimens from the state deposited in Mexican and international collections. We found 4,745 registered specimens—2,907 reptiles and 1,838 amphibians. This resulted in a total of 200 herpetological species for the state.

Resumen

Con la intención de actualizar el listado de las especies de herpetofauna para el estado de Jalisco se realizó la búsqueda de registros de anfibios y reptiles colectados en el estado de Jalisco en colecciones herpetológicas mexicanas y extranjeras. Se obtuvo un total de 4,745 registros, de ellos 2907 fueron de reptiles y 1838 de anfibios. Se registraron 200 especies de herpetológicas para el estado.

Introduction

Jalisco's geographic location in Mexico, together with its variety of topographic, orographic and climate characteristics provides an extensive range of habitats that contribute to its wide biological diversity. The state's herpetological richness is one of the most significant in the country based on Flores-Villela (1993a), and yet very few articles summarize this diversity. Until now this herpetological richness has been summarized by the following articles: Flores-Villela (1993b), Flores-Villela and Gerez (1994) and Smith and Taylor (1966). Other publications that have contributed to our knowledge of the state's herpetofauna, but have focused mainly on coastal areas, are those written by Casas-Andreu (1982), García and Ceballos (1994) and Ramírez-Bautista (1994).

The intention of this article is publish an up-to-date list of the herpetofauna of Jalisco. This was encouraged by the growing number of articles and books that have been published on the herpetofauna of other states or areas such as: Nuevo León (Contreras-Balderas, 1995), Distrito Federal (Uribe-Peña et al., 1999), Morelos (Castro-Franco and Bustos-Zagal, 2003), Chihuahua (Lemos-Espinal and Smith, 2007a), Coahuila (Lemos-Espinal and Smith, 2007b), Aguascalientes (Vázquez-Díaz and Quintero-Díaz, 2005) and Puebla (Woolrich-Piña et al., 2005).

Materials and Methods

The state of Jalisco has a surface area of 78,890 km²; it is located in western Mexico, between 18°15'05" and 22°51'49" north latitude and 101°28'15" and 105°43'18" west longitude (INEGI, 1981). Its geographic position includes two biogeographic regions: Nearctic and Neotropical. Within the state limits there are four physiographic provinces: La Sierra Madre Occidental, Eje Neovolcánico, Altiplano Mexicano and Sierra Madre del Sur (INEGI, 1981). The conjunction of these provinces and the very irregular orography allows a wide variety of climates, vegetation types and biological diversity to emerge.

Due to the diverse environmental conditions and habitats, Jalisco harbors 13 different vegetation types according to Rzedowski and McVaugh (1966): *palmar* (palm trees); *bosque tropical subcaducifolio y caducifolio* (tropical subdeciduous and deciduous forest); *bosque espinoso* (thorn scrub forest); *matorral subtropical* (subtropical matorral); *vegetación sabanoide* (coastal grasslands); *zacatal* (pasture); *matorral rosetófilo crasicaule* (succulent rosette scrub); *bosque de pino-encino* (pine-oak forest); *mesófilo de montaña* (montane mesophyllitic forest); *bosque de oyamel* (oyamel fir forest); *vegetación semiacuática y acuática* (aquatic and subaquatic vegetation); and *manglar* (mangrove forest).

The list obtained here was completed after reviewing national and international preserved collections. National collections reviewed were: Colección de Vertebrados del Centro de Estudios en Zoología de la Universidad de Guadalajara (CZUG); Colección Nacional de Anfibios y Reptiles del Instituto de Biología de la UNAM (CNAR); Colección de Anfibios y Reptiles de la Facultad de Ciencias Biológicas de la UNAM (FCUNAM); Colección Zoológica de la Universidad Autónoma de Guadalajara (UAG). International collections reviewed were: University of Kansas Natural History Museum (KU); California Academy of Sciences (CAS); University of California at Berkeley (MVZ); Field Museum of Natural History, Chicago (FMNH); Natural History Museum of the Smithsonian Institute (USNM); and Natural History Museum, Louisiana State University (LSUMZ).

The information on all specimens was collected in a data base, from which our analyses were done. Subspecies were not considered, because most of the specimens were not identified to this level. After examining all the records for Jalisco in these collections and corroborating that they all fell within state limits, there were a total of 4,745 records—2,907 for reptiles and 1,838 for amphibians.

The nomenclature and arrangement of the systematic list of

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Table 1. Amphibian and reptile taxa in the state of Jalisco, Mexico.

Order	Family	# of genera	# of species	# of Mexican endemics	# of protected species *
Anura	Bufonidae	3	7	5	0
	Hylidae	9	14	7	4
	Leptodactylidae	3	2	7	2
	Microhylidae	2	3	0	1
	Ranidae	1	9	6	7
	Scaphiopodidae	2	3	0	0
Caudata	Ambystomatidae	2	2	1	2
	Plethodontidae	2	2	2	2
Squamata	Anguidae	3	3	1	3
	Corytophanidae	1	1	0	0
	Eublepharidae	1	1	0	1
	Gekkonidae	4	5	1	2
	Helodermatidae	1	1	0	1
	Iguanidae	2	2	1	2
	Phrynosomatidae	4	24	13	4
	Polychrotidae	1	3	2	0
	Scincidae	3	8	5	3
	Teiidae	2	8	4	2
	Xantusidae	1	1	1	1
	Boidae	1	1	0	1
	Colubridae	35	65	38	28
	Elapidae	2	4	2	3
	Leptotyphlopidae	1	1	0	0
	Loxocemidae	1	1	0	1
	Typhlopidae	1	1	0	0
	Viperidae	2	9	5	8
Testudines	Bataguridae	1	2	1	2
	Kinosternidae	1	5	3	4
	Cheloniidae	3	3	0	3
	Dermochelidae	1	1	0	1
Crocodylia	Crocodylidae	1	1	0	11
Totals		92	200	106	83

* NOM-059-ECOL-2001

species was prepared using Smith and Taylor (1966), Flores-Villela (1993b) Bell et al. (2003), Flores-Villela and Canseco-Márquez (2004), Frost et al. (2006), and Liner and Casas-Andreu (2008). Endemic species determination was based on Flores-Villela (1993b) and Flores-Villela and Gerez (1994) articles. Conservation status was based on Norma Oficial Mexicana (NOM-059-ECOL-2001) (SEMARNAT, 2002).

Results

We report a total of 200 species of amphibians and reptiles

for the state of Jalisco, representing 92 genera, 31 families and 5 orders (see Appendix). Of the 200 species, 49 are amphibians and 151 are reptiles.

The most speciose reptile families are Colubridae (65) and Phrynosomatidae (24); the most speciose amphibian families are Hylidae (14) and Leptodactylidae (10) (see Table 1). With respect to genera, for amphibians the most speciose are *Lithobates* (9) and *Craugastor* (5); for reptiles we have *Sceloporus* (18), *Thamnophis* (10) and *Aspidoscelis* (7) accounting for the highest richness numbers (see Appendix).

Table 2. Numbers of species of amphibians and reptiles in Jalisco.

	Total # of species	Mexican endemics	Protected species*
Amphibians	49	28 (57.1%)	18 (36.7%)
Reptiles	151	78 (51.7%)	71 (47.0%)

* NOM-059-ECOL-2001

Of all species reported for the state of Jalisco 57.1% of the amphibians and 51.7% of the reptiles are endemic to Mexico (Table 2). Four species of reptiles are endemic to the state of Jalisco: *Dipsas gaigeae*; *Geophis bicolor*; *Pseudoleptodeira uribei* and *Crotalus lannomi*. Of the 200 species reported for the state, 18 amphibian and 71 reptile species are given some type of protected status in the Mexican NOM-059-ECOL-2001 (Table 2).

Discussion

Mexico is considered the most biologically diverse country in the world for amphibians and reptiles (Flores-Villela, 1993a). Two important articles that summarize this herpetological richness are Flores-Villela (1993b) and Flores-Villela and Gerez (1994).

Flores-Villela and Goyenechea (2003) report a total of 353 amphibian and 785 reptile species for Mexico; for the state of Jalisco our study found 49 amphibian and 151 reptile species. The state then harbors 13.9% and 19.2% respectively of the total herpetofauna reported for the country.

Of the total of species reported for the state of Jalisco, 28 (57.1%) amphibian and 78 (51.7%) reptile species are Mexican endemics. This reflects the magnitude of the state’s herpetofaunal richness, and makes it clear that there is an urgent need to take action for proper management and conservation of this diversity.

There is a considerable difference between the herpetological richness reported in this article and the numbers given by other authors, i.e., Casas-Andreu (1982), García and Ceballos (1994) and Ramírez-Bautista (1994). This is because all of those earlier studies were conducted only in the coastal region of the state.

Acknowledgments

We wish to thank the various national and international institutions for permitting us to consult their preserved collections. Without their data it would have not have been possible for us to create this updated list.

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Appendix

List of amphibians and reptiles for the state of Jalisco. The endemism is based on Flores-Villela (1993b) and Flores-Villela and Gerez (1994): EM = Endemic to Mexico, EJ = Endemic to Jalisco, NE = Not Endemic to Mexico. The protection categories are based on Norma Oficial Mexicana (NOM-059-ECOL-2001) (SEMARNAT, 2002) : A = Amenazada (Threatened), P = Peligro de extinción (Endangered), Pr = Protección especial (Special protection).

CLASS AMPHIBIA

ORDER ANURA

Family Bufonidae

Anaxyrus compactilis (Wiegmann, 1833) EM
Anaxyrus punctatus (Baird and Girard, 1852) NE
Incilius marmoreus (Wiegmann, 1833) EM
Incilius mazatlanensis (Taylor, 1940) EM
Incilius occidentalis (Camerano, 1879) EM
Incilius perplexus (Taylor, 1943) EM
Rhinella marina (Linnaeus, 1758) NE

Family Hylidae

Dendropsophus microcephalus (Cope, 1886) NE
Dendropsophus sartori (Smith, 1951) EM A
Diaglena spatulata (Günther, 1882) EM
Exerodonta smaragdina (Taylor, 1940) EM Pr
Hyla arenicolor Cope, 1866 NE
Hyla eximia Baird, 1854 NE
Pachymedusa dacnicolor (Cope, 1864) EM
Plectrohyla thorectes (Adler, 1965) EM Pr
Smilisca baudinii (Duméril and Bibron, 1841) NE
Smilisca dentata (Smith, 1957) EM A
Smilisca fodiens (Boulenger, 1882) NE
Tlalocohyla picta (Günther, 1901) NE
Tlalocohyla smithii (Boulenger, 1902) EM
Trachycephalus venulosus (Laurenti, 1768) NE

Family Leptodactylidae

Craugastor augusti (Dugés, in Brocchi, 1879) NE
Craugastor hobartsmithi (Taylor, 1937) EM
Craugastor occidentalis (Taylor, 1941) EM
Craugastor rhodopis (Cope, 1867) NE
Craugastor vocalis (Taylor, 1940) EM
Eleutherodactylus modestus (Taylor, 1942) EM Pr
Eleutherodactylus nitidus Peters, 1870 EM
Eleutherodactylus nivicolimae (Dixon and Webb, 1966) EM Pr
Eleutherodactylus saxatilis (Webb, 1962) EM
Leptodactylus melanonotus (Hallowell, 1861) NE

Family Microhylidae

Gastrophryne usta (Cope, 1866) NE Pr
Hypopachus variolosus (Cope, 1866) NE

Family Scaphiopodidae

Scaphiopus couchii (Baird, 1854) NE
Spea hammondi (Baird, 1859) NE
Spea multiplicata (Cope, 1863) NE

Family Ranidae

Lithobates berlandieri (Baird, 1859) NE Pr

Lithobates chiricahuensis (Platz and Mecham, 1979) NE A
Lithobates forreri (Boulenger, 1883) NE Pr
Lithobates magnaocularis (Frost and Bagnara, 1974) EM
Lithobates megapoda (Taylor, 1942) EM Pr
Lithobates montezumae (Baird, 1854) EM Pr
Lithobates neovolcanicus (Hillis and Frost, 1985) EM A
Lithobates pustulosus (Boulenger, 1883) EM Pr
Lithobates zweifeli (Hillis, Frost and Webb, 1984) EM

ORDER CAUDATA

Family Ambystomatidae

Ambystoma flavipiperatum Dixon, 1963 EM Pr
Ambystoma mavortium Baird, 1850 NE Pr

Family Plethodontidae

Chiropterotriton chiropterus (Cope, 1863) EM Pr
Pseudoeurycea bellii (Gray, 1850) EM A

CLASS REPTILIA

ORDER SQUAMATA

(Lizards)

Family Anguidae

Barisia imbricata (Wiegmann, 1828) EM Pr
Elgaría kingii Gray, 1838 NE Pr
Gerrhonotus liocephalus Wiegmann, 1828 NE Pr

Family Corytophanidae

Basiliscus vittatus Wiegmann, 1828 NE

Family Eublepharidae

Coleonyx elegans Gray, 1845 NE A

Family Gekkonidae

Gehrya mutilata (Wiegmann, 1834) NE Pr
Hemidactylus frenatus Schlegel in Duméril and Bibron, 1836 NE
Phyllodactylus lanei Smith, 1935 EM
Phyllodactylus tuberculosus Wiegmann, 1835 NE
Thecadactylus rapicaudus (Houttuyn, 1782) NE Pr

Family Helodermatidae

Heloderma horridum Wiegmann, 1829 NE A

Family Iguanidae

Ctenosaura pectinata (Wiegmann, 1834) EM A
Iguana iguana (Linnaeus, 1758) NE Pr

Family Phrynosomatidae

Holbrookia maculata Girard, 1851 NE
Phrynosoma asio Cope, 1864 NE Pr
Phrynosoma orbiculare (Linnaeus, 1758) EM A
Sceloporus aeneus Wiegmann, 1828 EM
Sceloporus bulleri Boulenger, 1894 EM
Sceloporus clarkii Baird and Girard, 1852 NE
Sceloporus dugesii Bocourt, 1873 EM
Sceloporus grammicus Wiegmann, 1828 NE Pr
Sceloporus heterolepis Boulenger, 1894 EM

Sceloporus horridus Wiegmann, 1834 EM
Sceloporus insignis Webb, 1967 EM Pr
Sceloporus melanorhinus Bocourt, 1876 NE
Sceloporus nelsoni Cochran, 1923 EM
Sceloporus poinsettii Baird and Girard, 1854 NE
Sceloporus pyrocephalus Cope, 1864 EM
Sceloporus scalaris Wiegmann, 1828 NE
Sceloporus siniferus Cope, 1869 NE
Sceloporus spinosus Wiegmann, 1828 EM
Sceloporus torquatus Wiegmann, 1828 EM
Sceloporus uniformis Cope, 1864 EM
Sceloporus variabilis Wiegmann, 1834 NE
Urosaurus bicarinatus (Duméril, 1856) EM
Urosaurus graciosus Hallowell, 1854 NE
Urosaurus ornatus (Baird and Girard, 1852) NE

Family Polychrotidae

Anolis nebulosus (Wiegmann, 1834) EM
Anolis rodriguezii Bocourt, 1873, *in* Duméril, Mocquard and Bocourt, 1870–1909 NE
Anolis schmidtii Smith, 1939 EM

Family Scincidae

Mabuya unimarginata Cope, 1862 NE
Plestiodon brevirostris (Günther, 1860) EM
Plestiodon copei (Taylor, 1933) EM Pr
Plestiodon dugesii (Thomiot, 1833) EM Pr
Plestiodon lynxe (Wiegmann, 1834) EM Pr
Plestiodon parvulus (Taylor, 1933) EM
Plestiodon tetragrammus Baird, 1858 NE
Sphenomorphus assatus (Cope, 1864) NE

Family Teiidae

Ameiva undulata (Wiegmann, 1834) NE
Aspidoscelis communis (Cope, 1878) EM Pr
Aspidoscelis costata (Cope, 1878) EM
Aspidoscelis deppii (Wiegmann, 1834) NE
Aspidoscelis lineatissima (Cope, 1878) EM Pr
Aspidoscelis sackii (Wiegmann, 1834) EM
Aspidoscelis scalaris (Cope, 1892) NE
Aspidoscelis tessellata (Say *in* James, 1823) NE

Family Xantusidae

Xantusia sanchezi Bezy and Flores-Villela, 1999 EM A

ORDER SQUAMATA

(Snakes)

Family Boidae

Boa constrictor Linnaeus, 1758 NE A

Family Colubridae

Clelia scytalina Cope, 1867 NE
Coluber bilineatus (Jan, 1863) NE
Coluber flagellum Shaw, 1802 NE A
Coluber mentovarius (Duméril, Bibron and Duméril, 1854) EM A
Coluber taeniatus (Hallowell, 1852) NE
Coniophanes lateritius Cope, 1862 EM
Conophis lineatus (Duméril, Bibron and Duméril, 1854) NE
Conophis vittatus Peters, 1860 EM

Conopsis biserialis Taylor and Smith, 1942 EM A
Conopsis lineatus (Kennicott *in* Baird, 1859) EM
Conopsis nasus Günther, 1858 NE
Diadophis punctatus (Linnaeus, 1766) NE
Dipsas gaigeae (Oliver, 1937) EJ Pr
Drymarchon melanurus (Duméril, Bibron and Duméril, 1854) NE
Drymobius margaritiferus (Schlegel, 1837) NE
Enulius flavitorques (Cope, 1869) NE
Ficimia publia Cope, 1866 NE
Geophis bicolor Günther, 1868 EJ Pr
Geophis dugesii Bocourt, 1883, *in* Duméril, Mocquard and Bocourt, 1870–1909 EM
Geophis semidoliatus Duméril, Bibron and Duméril, 1854 EM
Hypsiglena torquata (Günther, 1860) NE Pr
Imantodes gemmistratus Cope, 1861 NE Pr
Lampropeltis triangulum (Lacépède, 1789) NE A
Leptodeira maculata (Hallowell, 1861) EM Pr
Leptodeira septentrionalis (Kennicott, *in* Baird, 1859) NE
Leptodeira splendida Günther, 1895 *in* Salvin and Godman, 1895–1902 EM
Leptophis diplotropis (Günther, 1872) EM A
Manolepis putnami (Jan, 1863) EM
Mastigodryas cliftoni (Hardy, 1964) EM
Mastigodryas melanolomus (Cope, 1868) NE
Ninia sebae (Duméril, Bibron and Duméril, 1854) NE
Oxybelis aeneus (Wagler, 1824) NE
Pituophis deppei (Duméril, 1853) EM
Pseudoficimia frontalis (Cope, 1864) EM
Pseudoleptodeira latifasciata (Günther, 1894 *in* Salvin and Godman, 1895–1902) EM Pr
Pseudoleptodeira uribei Ramírez-Bautista and Smith, 1992 EJ Pr
Rhadinaea forbesi Smith, 1942 EM Pr
Rhadinaea hesperia Bailey, 1940 EM Pr
Rhadinaea laureata (Günther, 1868) EM
Rhadinaea taeniata (Peters, 1863) EM
Salvadora bairdi Jan, 1860 *in* Jan and Sordelli, 1860–1866 EM Pr
Salvadora mexicana Duméril, Bibron and Duméril, 1854 EM Pr
Senticolis triaspis (Cope, 1866) NE
Sibon nebulata (Linnaeus, 1758) NE
Sonora michoacanensis Dugès *in* Cope, 1884 EM
Sonora semiannulata Baird and Girard, 1853 NE
Storeria storeroides (Cope, 1865) EM
Symphimus leucostomus Cope, 1870 EM Pr
Sympholis lippiens (Cope, 1862) EM
Tantilla bocourti (Günther, 1895 *in* Salvin and Godman, 1895–1902) EM
Tantilla calamarina Cope, 1867 EM Pr
Thamnophis cyrtopsis (Kennicott, 1860) EM A
Thamnophis elegans (Baird and Girard, 1853) NE A
Thamnophis eques (Reuss, 1834) NE A
Thamnophis godmani (Günther, 1894 *in* Salvin and Godman, 1895–1902) EM A
Thamnophis melanogaster (Peters, 1864) NE
Thamnophis scalaris Cope, 1861 EM A
Thamnophis scaliger (Jan, 1863) EM A
Thamnophis sirtalis (Linnaeus, 1758) NE
Thamnophis sumichrasti (Cope, 1867) EM A
Thamnophis validus (Kennicott, 1860) EM
Trimorphodon biscutatus (Duméril, Bibron and Duméril, 1854) NE Pr
Trimorphodon tau Cope, 1870 EM
Tropidodipsas annulifera (Boulenger, 1894) EM Pr
Tropidodipsas philippi (Jan, 1863) EM Pr

Family Elapidae

Micrurus distans (Kennicott, 1860) EM Pr
Micrurus laticollaris (Peters, 1869) EM Pr
Micrurus nigrocinctus (Girard, 1854) NE Pr
Pelamis platurus (Linnaeus, 1766) NE

Family Leptotyphlopidae

Leptotyphlops humilis (Baird and Girard, 1853) NE

Family Loxocemidae

Loxocemus bicolor Cope, 1861 NE Pr

Family Typhlopidae

Ramphotyphlops braminus (Daudin, 1803) NE

Family Viperidae

Agkistrodon bilineatus (Günther, 1863) NE Pr
Crotalus basiliscus (Cope, 1864) EM Pr
Crotalus lannomi Tanner, 1966 EJ A
Crotalus lepidus (Kennicott, 1861) NE Pr
Crotalus molossus Baird and Girard, 1853 NE Pr
Crotalus polystictus (Cope, 1865) EM Pr
Crotalus pusillus Klauber, 1952 EM A
Crotalus scutulatus (Kennicott, 1861) NE Pr
Crotalus triseriatus (Wagler, 1830) EM

ORDER TESTUDINES

Family Bataguridae

Rhinoclemmys pulcherrima (Gray, 1856) NE A
Rhinoclemmys rubida Cope, 1870 EM Pr

Family Cheloniidae

Chelonia mydas (Linnaeus, 1758) NE P
Eretmochelys imbricata (Linnaeus, 1766) NE P
Lepidochelys olivacea (Eschscholtz, 1829) NE P

Family Dermochelyidae

Dermochelys coriacea (Vandelli, 1761) NE P

Family Kinosternidae

Kinosternon chimalhuaca Berry, Seidel and Iverson, 1997 EM
Kinosternon herrerae Stejneger, 1925 EM Pr
Kinosternon hirtipes (Wagler, 1830) NE Pr
Kinosternon integrum LeConte, 1854 EM Pr
Kinosternon scorpioides (Linnaeus, 1766) NE Pr

ORDER CROCODYLIA

Family Crocodylidae

Crocodylus acutus (Cuvier, 1807) NE Pr

Notes on Reproduction of the Mulga Dragon, *Caimanops amphiboluiroides*, and the Western Netted Dragon, *Ctenophorus reticulatus*, (Squamata: Agamidae) from Western Australia

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Abstract

Histological analyses were conducted on gonadal material of two Australian agamid lizards, *Caimanops amphiboluiroides* and *Ctenophorus reticulatus*. *Caimanops amphiboluiroides* males from December and February were undergoing spermiogenesis. Females of *C. amphiboluiroides* from December contained eight and ten enlarged follicles (> 4 mm), respectively. *Ctenophorus reticulatus* males from October, December, January and May were undergoing spermiogenesis. One female *C. reticulatus* from October contained corpora lutea from a previous egg clutch and concomitant yolk deposition for a subsequent clutch indicating production of multiple clutches in the same reproductive season. It appears the reproductive cycles of *C. amphiboluiroides* and *C. reticulatus* most closely fit the Type I category of Heatwole and Taylor (1987) in which spermatogenesis and ovulation occur in spring.

Caimanops amphiboluiroides occurs in the southern interior of Western Australia extending to coastal regions between Shark Bay and Exmouth Gulf (Cogger, 2000), where its abundance is very sparse (Ehmann, 1992). I know of no published information on its reproduction. *Ctenophorus reticulatus* ranges throughout most of the southern half of Western Australia and northern South Australia (Cogger, 2000). Information on reproduction of *C. reticulatus* is in Pianka (1986), Greer (1989), Bush (1992) and Ehmann (1992). The purpose of this note is to provide information on *Caimanops amphiboluiroides* and *Ctenophorus reticulatus* reproduction from a histological analysis of museum specimens.

Thirteen *C. amphiboluiroides*: 6 males, mean snout-vent length, SVL = 72.5 mm $\pm$ 6.9 SD, range = 64–82 mm; five females, SVL = 76.4 mm $\pm$ 15.3 SD, range = 63–100 mm, and two juveniles, 37.5 mm $\pm$ 0.71 SD, range = 37–38 mm collected 1966 to 1968 in Western Australia between 26°34'S to 28°27'S and 119°04'E to 120°40'E and 13 *C. reticulatus*: 7 males, SVL = 82.6 mm $\pm$ 6.2 SD, range = 75–91 mm; 5 females, SVL = 70.6 mm $\pm$ 4.0 SD, range = 64–74 mm, and one juvenile, 28 mm SVL collected 1967 in Western Australia between 25°55'S to 29°36'S and 118°40'E to 124°51'E were examined from the herpetology collection of the Natural History Museum of Los Angeles County (LACM), Los Angeles, California: *C. amphiboluiroides* LACM 55283-55295; *C. reticulatus* LACM 55051, 55054, 55055, 55058, 55062, 55063, 55066, 55070, 55071, 55076, 55079, 55080, 55083.

Histological slides were prepared by conventional methods and stained with Harris' hematoxylin followed by eosin counterstain (Presnell and Schreiber, 1997). Testis slides were evaluated as to the stage of the testicular cycle. Ovary slides were examined for vitellogenesis (yolk deposition) or corpora lutea. Enlarged ovarian follicles (> 4 mm width) were counted. Histology slides were deposited at LACM. Male and female mean body sizes (SVL) were compared with an unpaired *t* test using Instat (vers. 3.0b, Graphpad Software, San Diego, CA).

There was no significant size difference between male and

female mean body sizes (SVL) for *C. amphiboluiroides* (unpaired *t*-test, $P = 0.59$). The only stage present in the testicular cycle was sperm formation (spermiogenesis) in which the lumina of the seminiferous tubules were lined by clusters of spermatozoa or metamorphosing spermatids. The male samples were from austral winter: December ($n = 4$), February ($n = 2$). The smallest reproductively active male measured 64 mm SVL (LACM 55289).

The female samples of *C. amphiboluiroides* were from austral winter: December ($n = 4$), January ($n = 1$). Two of the December sample were not undergoing yolk deposition, the other two females contained 8 and 10 enlarged ovarian follicles, respectively. The one female *C. amphiboluiroides* from January was not undergoing yolk deposition. Mean clutch size for two females was 9.0 $\pm$ 1.4 SD, range = 8–10. The smallest reproductively active female (enlarged follicles > 4 mm width) measured 82 mm SVL (LACM 55285).

The two *C. amphiboluiroides* juveniles: one from March, (LACM 55293) measured 38 mm SVL and one from April (LACM 55294) measured 37 mm SVL.

Mean body sizes of *C. reticulatus* males were significantly larger than those of females (unpaired *t*-test, $t = 3.78$, $df = 10$, $P = 0.004$). As was the case for *C. amphiboluiroides*, the only stage present in the testicular cycle of *C. reticulatus* was spermiogenesis which occurred in all monthly samples: (spring) October ($n = 1$), (summer) December ($n = 2$), January ($n = 1$), and (autumn) May ($n = 3$). The smallest reproductively active male measured 75 mm SVL (LACM 55076).

Of five *C. reticulatus* females examined, all three October females exhibited reproductive activity. One (LACM 55063) contained corpora lutea from a previous egg clutch and concomitant yolk deposition for a subsequent clutch indicating *C. reticulatus* may produce multiple clutches in the same reproductive season. A second October female (LACM 55062) contained corpora lutea from a previous egg clutch but no concomitant yolk deposition. A third October female (LACM 55071)

contained 2 yolking (3 mm diameter) follicles in each ovary constituting a clutch of 4 eggs, assuming they completed development. The one December female (LACM 55079) contained corpora lutea but no concomitant yolk deposition. The one May female (LACM 55058) was not undergoing yolk deposition and exhibited no reproductive activity. The smallest reproductively active female measured 70 mm SVL (LACM 55071).

One presumed *C. reticulatus* neonate (LACM 55066) measured 28 mm SVL and was from December.

Pianka (1986) reported a mean clutch size of 4.0 ± 1.2 SD for 7 *C. reticulatus*. Bush (1992) reported a clutch size of 7 and Greer (1989) and Ehmann (1992) reported clutches of 3–8 eggs and 2–8 eggs, respectively. Mating probably occurs in spring (October) and hatching in summer (December) Greer (1989). While sample sizes are too small to completely describe their

reproductive cycles *C. amphiboluroides* and *C. reticulatus*, appear to most closely fit the Type I category of Heatwole and Taylor (1987) in which spermatogenesis and ovulation occurs in austral spring. This appears likely as the collection of two *C. amphiboluroides* young, one each from March and April, and one *C. reticulatus* juvenile in December suggests eggs hatch in spring. Reproduction occurs mainly in the spring–summer in most agamids inhabiting temperate parts of Australia (Greer, 1989). Examination of additional monthly samples are needed to further elucidate the reproductive cycles of *C. amphiboluroides* and *C. reticulatus*.

Acknowledgment

I thank Christine Thacker (LACM) for permission to examine *C. amphiboluroides* and *C. reticulatus*.

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A Serpentes Prelude: *Carphophis amoenus*, Eastern Worm Snake

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From an early age, snakes and music have been an important part of my life. I first became interested in snakes when I was about 11 or 12 years old; I began playing guitar around the same age. However, these two pursuits have for the most part been independent of one another. In an attempt to unite these interests, and to educate fellow musicians about the legless “lizards” we call snakes, I composed and published twenty-four preludes for piano, titled *The Serpentes Preludes*.^{*} As far as I’m aware, snakes have not inspired too many compositions in the classical piano repertoire. There are exceptions in other genres; in the 1920s, blues guitarist Lonnie Johnson performed and recorded Victoria Spivey’s Garter Snake Blues, and Blind Lemon Jefferson “cut” Black Snake Moan. Several other examples in bluegrass and rock could be listed. I chose the piano for these pieces because it is an instrument for which, although I don’t play, I enjoy listening to and wish I could play.

For the Serpentes Preludes, each was “dedicated” to a particular species of snake (12 New World and 12 Old World species). I selected characteristics, such as the number and type of scales, to set parameters, such as meter, key, tempo, etc. The prelude on the following page, dedicated to *Carphophis amoenus*, was not included in my book of twenty-four, but was composed specifically for the *Bulletin of the Chicago Herpetological Society* in the hope that it would inspire others with artistic talents, who also happen to have an interest in snakes (or any other group of herps) to incorporate them into their creations.

Like its predecessors, the *Carphophis amoenus* prelude was composed using the following “rules”:

- 1) Key was determined by the first letter in the species’ generic (genus) name; in this case *Carphophis* = C.
- 2) Dorsal scale type (smooth or keeled) was used to determine whether the prelude was to be in a major (smooth) or minor (keeled) key. *Carphophis amoenus* has smooth scales, so the key is major.
- 3) Meter was chosen based on whether the anal plate is single or divided. If the scale is single, a triple or compound meter was



Figure 1. Head of an eastern worm snake, *Carphophis amoenus*. Photograph by Mark Lethaby.

chosen ($\frac{3}{4}$ or $\frac{6}{8}$); if it is divided, a duple or quadruple meter was chosen ($\frac{2}{4}$ or $\frac{4}{4}$). In *C. amoenus* the anal plate is divided, so I chose $\frac{4}{4}$.

4) Tempo was based on the number of ventral scales reported for the species. The eastern worm snake has 108–140 ventral scales.

5) The length of each prelude (number of measures) was dependent upon the reported number of dorsal scale rows at mid-body. *Carphophis amoenus* has 13 dorsal scale rows at mid-body, and the prelude is 13 measures long.

Carphophis amoenus is a small (usually less than 13 inches total length) burrowing snake, with a somewhat flattened head (Figure 1). They are indigenous to the eastern United States and are most often found under some type of cover, such as a rock, log or debris. *Carphophis amoenus* feeds almost exclusively on earthworms.

This diminutive prelude was also meant as a tribute to J. S. Bach’s short keyboard works, which he composed as teaching pieces for his wife and family.

^{*} Readers of the CHS *Bulletin* who wish to purchase *The Serpentes Preludes* (\$10.00 a copy, postage paid) should email the author to make sure copies are still available.

Serpentes Prelude

Carphophis amoenus

Brian S. Gray

$\text{♩} = 108$

Piano

mf

f

fz f fz f

rit.

p

What You Missed at the June Meeting

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June is often our most attended meeting. It's no secret that most of us enjoy showing off our animals, especially to an appreciative audience, and the June meeting attendance demonstrates that very well, but this year it reinforced one of my observations about the CHS. We're not only a strange group of people (Come on, whose neighbors think they're normal? At least the neighbors that know what our interests are?), but we're a diverse group of people. From Sam Blanton with Bam Bam the bearded dragon to Sue Knight with a dozen of the sand boas that she has specialized in breeding for the last ten years. We have academics and zookeepers and field herpers and breeders and kids with one animal and kids with dozens and old folks and young ones. I wonder what it is about these animals that attracts so diverse a crowd? I think that one factor is the accessibility of reptiles and amphibians. When I was doing Chicago Park District shows with Jenny Vollman we would often have our very ordinary snakes or turtles or frogs right across the path from the raptor tent. I like birds, and raptors always have a special appeal (sort of like the appeal of venomous snakes), but our tent would always have bigger crowds because you could hold a snake or a turtle. You could look at the birds. Handling appeals to everyone it seems.

The night got started with Jack Schoenfelder and his annual kids' raffle. Throughout the year Jack acquires various herp-related items that have special appeal to kids, from nifty little cages to stuffed animals. At the June meeting he makes sure that each kid gets a raffle ticket and he raffles off all his prizes. For free. The prizes are cool and the kids have a good time and Jack does it all on his own. It's members that make this society, and Jack is a fine example of the many ways that's possible. Thank you, Jack.

Of course, Jack isn't the only member who does extra work. Zorina Banas frequently lugs a cooler full of drinks to the meeting so that we can slake our thirst, and we can never overlook Josh Chernoff, the raffle man, who every month hauls a load of goods to the meeting for the regular raffle. The "grown up" raffle was conducted after the kids' raffle and then we launched into the core of the June meeting with Elena Moss and her three-year old blue-tongued skink (*Tiliqua* sp.) named Nancy, though she wasn't sure on the Nancy part because blue-tongued skinks are very difficult to sex. The lizard didn't belong to Elena, but rather to the pet shop where she worked, and it displayed the gentle demeanor that makes it a favorite at the shop. We learned that these skinks are non-swimmers but great climbers.

Lawrence Huddleston, because he enjoys local field herping so much (check out his posts on our forum) brought one of the native animals that he encounters frequently. Holding a common snapping turtle (*Chelydra serpentina*) about the size of a dinner plate, Lawrence told us how they could reach 50 pounds and 18–20 inches in size. The one he had was a rescue and he kept it outside in the summer and in a 100-gallon tank during the winter. They range from southern Canada to Ecuador.

Sam Blanton brought the aforementioned Bam Bam, who lives with Pebbles, a pair of bearded dragons (*Pogona vitticeps*). Both were rescues. Pebbles was indisposed that evening but Bam Bam seemed proud to be on display, looking around and perhaps hoping for a bit of his favorite food, carrots. Bearded are omnivores.

Quinn Bozek brought Robert the crested gecko (*Rhacodactylus ciliatus*), which managed to display his jumping ability while batting his eyelashes at us. OK, we all know that he can't bat them and they're not eyelashes, but they look good anyway. Quinn said that when Robert walks on his arm it tickles.

Michael Perry returned with his leopard gecko (*Eublepharis macularius*), once again on his shoulder, surveying the world with apparent attention and probably wondering where the mealworms were. The lizard was five years old when Michael acquired it and he's had it for three or four years and it's looking good. I think we'll be seeing both Michael and the lizard for several more years.



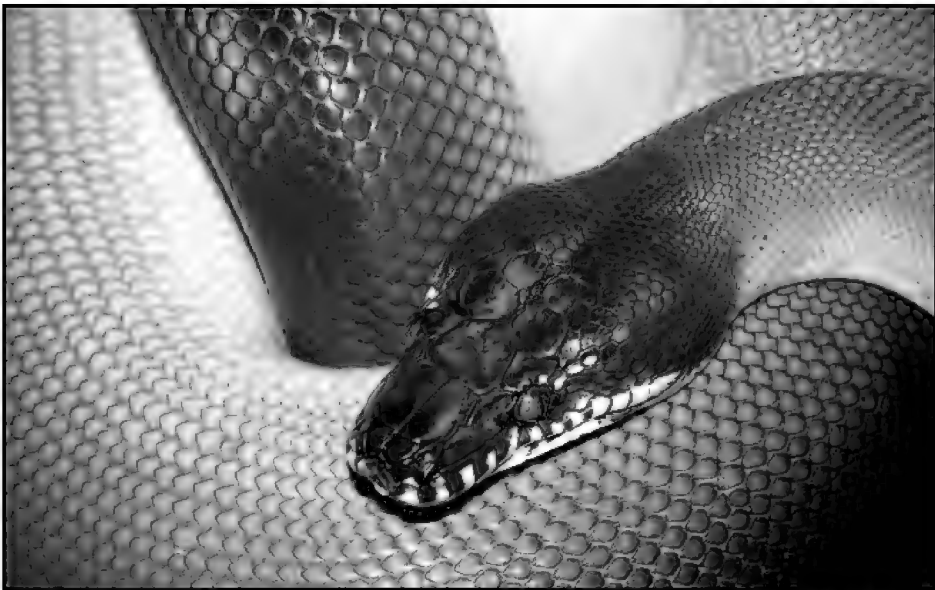
Lawrence Huddleston and his common snapping turtle (*Chelydra serpentina*). Photograph by Tlaloc Soria.



Michael Perry returned with his 8-year-old leopard gecko (*Eublepharis macularius*) we still think should be called Chip. Photograph by Jessica Tschampa.



A fantastic ball python (*Python regius*). Photograph by Jessica Tschampa.



Andy Sagan brought Awesome, his beautifully iridescent white-lipped python (*Leiopython albertisii*). Photograph by Jessica Tschampa.



One of Chuck Knight's amazing ball python morphs. Photograph by Jessica Tschampa.



Sue Knight with one of several sand boas (*Eryx* spp.) that she showed and talked about. Photograph by Lawrence Huddleston.



One of Dan Nathan's green iguanas (*Iguana iguana*) climbing on the portable structure Dan has built for displaying them. Dan didn't talk at the show and tell, but he did bring several of his rescued lizards. Photograph by Tlaloc Soria.

Nancy Kloskowski brought her juvenile black rat snake (*Pantherophis obsoletus*) named Remy (after the rat in the movie *Ratatouille*) still showing some of the spots that it had as a neonate when Mike Dloogatch found it crossing a road in southern Illinois. As it grows to five feet it will gradually lose most, if not all, of its pattern and become all black.

Rene R. Rivera brought one of his favorite Pueblan milk-snakes (*Lampropeltis triangulum campbelli*). The perfectly ringed little apricot Pueblan had just eaten, but Rene assured us that she did well in crowds and she was definitely one of the 80 to 100 hatchlings he's had that will become a breeder. Rene likes to breed Pueblans even though the young tend to be defensive and the adults are fast and escape artists.

Jim Foster brought one of his five Indian star tortoises (*Geochelone elegans*). The gorgeous little turtle was about four-years old and four inches long, and Jim showed us that not only is the carapace beautiful, but the plastron is also strikingly marked. He feeds them mixed greens, dandelions, carrots and cactus pads. These animals are under heavy pressure in the wild from collectors. Jim is hoping to breed his eventually, but tortoises take a long time to sexually mature.

Andy Sagan brought in an Albert's or white-lipped python (*Leiopython albertisii*) from New Guinea that he held up to the lights to better show off the striking iridescence of the animal. The iridescence results from light passing through crystalline structures within the cells of the snakes' dermis. These are awesome animals, so Andy named his snake Awesome. They have a strong cage defense response, but once removed Awesome appeared to be easy to handle and not excitable at all. These snakes actually regurgitate a hairball about the same time they defecate. Awesome is truly an unusual and beautiful snake.

Josh Chernoff followed Andy with another iridescent snake, a Brazilian rainbow boa (*Epicrates cenchria cenchria*) that he acquired when he went to pick up a "Burmese python" (*Python molurus bivittatus*). Upon arriving at the pick-up point at night, he was handed a snake in a bag. From the little he could make out, it looked like no other Burmese he had seen, and once he got the animal home and could look at it in the light and out of the bag, he was excited about his find. Sometimes good deeds are rewarded. Bob Bavrisha brought out his normal Burmese python for comparison. All snakes have appeal, but the rainbow easily won this beauty contest. When asked, Josh said that he fed it "... medium sized rats with ketchup and mustard."

Two new members presented their animals next. Chuck and Sue Knight have been members for only a couple of months, but we're looking forward to seeing more of them. Chuck breeds ball pythons (*Python regius*), and he brought a couple of his favorites, a very large normal female and a smaller gorgeous pastel lesser morph. Chuck freely admitted that fifteen years ago he wouldn't have been found in the same room with a snake, but he credits Sue with helping him discover how cool these animals really are and now he has over fifty snakes and breeds cool ball python morphs. He stressed that new animal owners should get advice from the experts. I think that Chuck is now one of the experts on ball pythons. Sue had brought about

a dozen very cool looking sand boas, but only displayed a few because of the time left. She's been breeding the sand boas (*Eryx* spp.) for ten years, and obviously she'd done her homework. She's dealt with many of the different species, has bred many different morphs, and knows much of what is known about their natural history. She keeps all of her sand boas on aspen bedding with water dishes (apparently there is debate about whether or not sand boas need water). Some species are egg layers but most have live young. I think that Sue will be an excellent source of information on sand boas.

Nick D'Andrea brought up an adopted albino Burmese python that looked to be about ten-feet long named Lemon. Previously kept in a 175-gallon aquarium, Nick had to put her on a diet because she was too fat when he got her. The previous owner said she was a male, but when she laid eggs Nick was pretty convinced that she was a female. A docile, gentle creature like all his Burms, Nick uses Lemon in a lot of shows.

Gavin Brink was maneuvered into showing off his latest acquisition, a juvenile puffing snake (*Pseustes poecilonotus*) from Latin America. This little snake was about eighteen inches long but they get 6 to 8 feet long, and Gavin was quite aware that its feisty temperament could cause him to be bit before he rebagged the snake. Fortune smiled and I didn't see any blood, but the skinny little snake certainly was puffed up. Seems to me many arboreal snakes that eat birds and eggs have a less than cuddly personality. Gavin named him Reindeer Dippin after the famous bull in the PBR circuit. Look it up. I had to.

Once again Bob and Dan Bavrisha waited until last so they could either fill in time or cut it short. It was late and they were not going to present even though they had hauled quite a few animals to the museum, but begging from the crowd convinced them to display a couple of animals. Bob started out with a Chicago garter snake (*Thamnophis sirtalis semifasciatus*) found in the back yard of his childhood home while he was clearing weeds. It was one of nine that he had found. Seems that one of Bob's first snakes was a Chicago garter snake that he kept captive. He acquired two more and then later that summer his snakes presented him with 140 babies. All 140 babies escaped. His mother swore until her death that there were snakes in the yard. Bob is fairly certain that the snakes he's finding today on that narrow lot in Bridgeport are all descendants of those 140 babies. How cool is that? They then pulled out a small alligator (*Alligator mississippiensis*) and a small Nile crocodile (*Crocodylus niloticus*). Jessica Tschampa filmed that part and you can view it on the CHS forum here: <http://www.chicagoherp.org/forum/viewtopic.php?t=868>. Scroll down until you find eiudragon's post on gators and crocs. The Bavrisha's have now rescued 592 crocodilians. Amazing!

The meeting ran late, but not many people left before the end. It's just too much fun looking and listening and learning about these great animals. I won't complain about the length but I will complain that no amphibians were represented. Next year that will not happen, right? And next year more parents should bring the kids. We'll put them on first and not feel hurt if you leave early, but this is always the meeting with the most animals and the most prizes. Come on down!

Herpetology 2009

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

NEW U.S. SALAMANDER SPECIES

C. D. Camp et al. [2009, Journal of Zoology 279:1-9] describe the patch-nosed salamander, *Urspeleperpes brucei*, a striking new species of the lungless salamander family Plethodontidae from the Appalachian foothills of northern Georgia, USA. This miniature species, c. 25–26 mm (adult standard length), is so distinctive genetically and morphologically that the authors erected a new genus, the first new genus of amphibian described from the U.S. in nearly 50 years. It is unique among plethodontids from eastern North America in displaying sexual color dimorphism. Although certain miniaturized plethodontids exhibit a reduced number (four) of digits on the pes, this species has a full complement of five toes. A plethodontid phylogeny derived from mitochondrial and nuclear DNA sequences places it in the tribe Spelerpini as the sister taxon to *Eurycea*. Genetic divergence between the new species and *Eurycea* for the nuclear gene Rag-1 (4.7%) is among the higher levels observed between long-established spelerpine genera (2.6–5.3%). The eponym honors Richard Bruce, professor emeritus at Western Carolina University and a well-respected, longtime salamander researcher. One of the two discoverers of the first specimen, William Peterman, received a \$500 CHS grant in 2007 to study salamanders in the southern Appalachians. This new form appears to be rare and is of immediate conservation concern.

ECOLOGY OF JUVENILE HAWKSBILLS

J. M. Blumenthal et al. [2009, Chelonian Conservation and Biology 8(1):1-10] present results of an inwater research program focusing on basic ecology of juvenile hawksbill turtles (*Eretmochelys imbricata*) in the Cayman Islands. The results are based upon 206 captures of 135 hawksbills in Little Cayman and 103 captures of 97 hawksbills in Grand Cayman. The Cayman Islands aggregation demonstrated a broad size distribution (20.5–62.6 cm straight carapace length), slow growth rate (3.0 ± 0.9 cm/y), and multiple recaptures, suggesting long-term residence in some individuals. Demonstrated home range was small (mean distance from capture to recapture 545 ± 514 m, range 2–2080 m); although, an international tag return suggested a long-range developmental migration. Vertical features provided important habitat in Little Cayman, and larger turtles were generally captured in deeper waters. Behavior at sighting varied by habitat: resting, swimming, and feeding were observed in coral reef, reef wall, and hardbottom colonized by sponges and gorgonians, and resting was frequently observed in uncolonized hardbottom. Images obtained from underwater photographers show that hawksbills forage on sponges and occasionally on jellyfish. An apparent commensal feeding relationship between hawksbills and 3 species of angelfish was observed, as well as aggressive interactions between hawksbills. The study also documented causes of injury and mortality in the study area—including legal, illegal and incidental take, vessel collisions, hurricanes, and natural predation.

BLACK PINESNAKE SPATIAL ECOLOGY

D. L. Baxley and C. P. Qualls [2009, J. Herpetology 43(2):284-293] note that as remaining longleaf pine forests increasingly become fragmented, wildlife management becomes a daunting task, especially for rare and relatively unstudied taxa such as the black pinesnake (*Pituophis melanoleucus lodingi*). Appropriate management for *P. m. lodingi* depends on understanding the ecology of this subspecies. The two main objectives of this study were to address questions of spatial ecology for *P. m. lodingi* on a rangewide scale, and to employ small mammal trapping within home ranges of telemetered snakes to investigate the relationship between prey density and spatial ecology. Black pine-snakes exhibited large home ranges (Minimum Convex Polygon home ranges were 92–396 ha), frequently crossed roads, and average (nonzero) movement distance was 338 m per location event. Core home ranges of telemetered *P. m. lodingi* were characterized by significantly greater abundances of hispid cotton rats (*Sigmodon hispidus*) and significantly higher total small mammal biomass. By better defining the relationship between spatial ecology and prey dynamics for *P. m. lodingi*, land managers will be better equipped to manage and conserve remaining populations of this longleaf pine specialist.

EFFECTS OF HABITAT STRUCTURE ON AMPHIBIANS

J. L. Purrenhage and M. D. Boone [2009, Herpetologica 65(1):14-30] note that habitat destruction and alteration is a major cause of population declines; thus, habitat restoration is essential for preventing species extinctions. Habitat restoration, however, may be hindered by an inadequate understanding of species' habitat requirements. Habitat structure may play a major role in influencing the biotic interactions among species. Pond-breeding amphibians are one group that has experienced loss and alteration of critical habitats. Vegetation structure in wetland environments may be important to amphibian larvae if its presence mediates biotic interactions, such as competition, which can affect growth and survival to metamorphosis. Despite the potential importance of habitat structure and competition, few studies have examined these factors simultaneously. In a full-factorial pond mesocosm experiment, the authors tested for the effects of variation in habitat structure and density of a larger tadpole competitor (*Rana pipiens*, northern leopard frog) on development and survival of three species of larval amphibians: *Bufo americanus* (American toad), *Hyla versicolor* (gray treefrog), and *Ambystoma maculatum* (spotted salamander). Survival of *Bufo* was greater in mesocosms with live or artificial cattails than in those lacking vegetation. Although responses varied among species, this study suggests that time to metamorphosis, survival, and species evenness can be influenced by both aquatic habitat structure and competition, whereas size at metamorphosis is affected primarily by competition. This study is the first to demonstrate that vegetation structure alone can affect the expression of metamorphic traits for some anuran species.

DENSITY DEPENDENCE OF WOOD FROGS

K. A. Berven [2009, *Copeia* 2009(2):328-338] notes that population regulation in pond-breeding amphibians has generally been assumed to occur through density dependence in the aquatic larval stage. However, studies examining terrestrial stage population dynamics are comparatively rare. As a consequence, the relative importance of density dependence in the terrestrial stage remains largely unknown. This study determines the density dependence of terrestrial stage vital rates, including juvenile and adult survival, age and size at first reproduction, and reproductive traits, for a population of wood frogs, *Rana sylvatica*, in Michigan. Also examined are the carry-over effects of density-dependent variation in metamorphic traits on adult demographic traits. During the 21 years of this study, the number of breeding adult males and females varied by an order of magnitude, whereas the number of metamorphic juveniles leaving the pond varied by two orders of magnitude. Adult male and female annual survival was negatively correlated with the number of males and females, respectively. Partial correlation coefficients (holding population size of the opposite sex, number of juveniles, and precipitation levels constant) indicated that variation in adult male and female survival was largely explained by variation in the number of males and females, respectively. Juvenile survival (both males and females) was strongly negatively correlated with juvenile population size but not juvenile body size, adult population size, or total precipitation. Variation in juvenile population size was the single most important factor accounting for variation in male and female juvenile survival, and female age and size at first reproduction. Clutch size and egg size also varied with juvenile population size independent of female body size. At lower juvenile population sizes, female juveniles matured earlier, at a larger body size, and produced larger numbers of smaller eggs than at high juvenile population sizes. Although juvenile body size was positively correlated with male and female reproductive body size and total clutch weight, juvenile fitness traits, in general, were more closely related to variation in juvenile population sizes. Larval traits did not affect adult fitness traits in the terrestrial stage. As number of juveniles produced increased, the number of surviving adult males, females, and total biomass plateaued, suggesting that the terrestrial environment limited adult population size. These results demonstrate that density-dependent effects operating in the terrestrial stage may be important in regulating wood frog population size.

SIMULATED OVERCROWDING AFFECTS TADPOLES

M. A. Brett et al. [2009, *J. Herpetology* 43(1):165-168] note that *Rana sylvatica* tadpoles have been shown to alter their oral structures in response to increased competition. The placement of mirrors on tank walls has previously been used to simulate increased density and to induce phenotypic changes in tadpole size and timing of metamorphosis. The authors examined the effects of simulated overcrowding, induced with mirrors, on the oral structures of *R. sylvatica* tadpoles. The resulting data suggest that, although phenotypic changes caused by visually simulated competition are not as drastic as those produced by actual competition, they do occur. These alterations manifest in a failure to develop specific tooth rows.

RADIATED TORTOISE CONSERVATION

S. R. Paquette et al. [2009, *Chelonian Conservation and Biology* 8(1):84-93] note that the radiated tortoise (*Astrochelys radiata*), endemic to the spiny forest of southern Madagascar, had virtually never been studied in the wild until the late 1990s. Recent research projects and surveys have contributed to defining the extent of the decline of the species, and it now appears that *A. radiata* faces serious extinction risks unless current trends are halted. As part of an ongoing conservation genetics project concerning the species, the authors investigated genetic diversity and differentiation of the isolated tortoise population from Parc National d'Andohahelo (PNA), considered as one of the last remaining sanctuaries of the species in the southeast, where Antanosy people consume tortoise meat. Genetic diversity at PNA was similar to other populations, but differentiation was the greatest of all sites sampled, emphasizing the conservation value of this population. However, the most important finding was that the majority of captured tortoises at PNA were relatively small males, indicating that recruitment may be very low. The authors found physical evidence that Antanosy poachers are removing the largest individuals from the population, despite their official protection within the park. They discuss conservation issues related to *A. radiata*, including the role of protected areas in Madagascar, the importance of understanding the taboo toward tortoises in Antandroy and Mahafaly communities, and the pertinence of the current Convention on International Trade in Endangered Species listing of the species.

MOSQUITOFISH AND AUSTRALIAN FROGS

S. J. Reynolds [2009, *Copeia* 2009(2):296-302] notes that the small, introduced poeciliid *Gambusia holbrooki* is widely distributed in Australia, and is widespread and generally abundant in lacustrine environments near Perth, Western Australia. Laboratory feeding trials and field investigations were conducted to evaluate the impact of this species on native frogs in southwestern Australia. The eggs of *Crinia georgiana*, *C. insignifera*, *Litoria adelaidensis*, and *L. moorei* were not consumed by *G. holbrooki*. In contrast, *Crinia georgiana*, *C. insignifera*, *C. glauerti*, and *Litoria moorei* hatchlings (Gosner stage 20-23) were consumed by *G. holbrooki*. Alternative aquatic invertebrate prey (mosquito larvae and *Daphnia*) were preferred over hatchlings. *Gambusia holbrooki* were recorded at 20 of 25 wetlands surveyed, and frogs occurred at all 25 sites. From one to six frog species occurred at wetland sites where fish were present. Frog species richness, and the presence of individual species, did not differ between sites with and without *G. holbrooki*. However, frog species richness was positively correlated with wetland condition (highly ranked sites were relatively undisturbed). In contrast to the situation in eastern Australia, populations of anuran species in southwestern Australia do not appear to be strongly affected by this small invasive fish. This difference is likely related to climatic dissimilarities that affect the population biology of fish and frogs in these regions. Additional factors that may influence the level of impact of *G. holbrooki* include egg deposition site, timing of anuran breeding, availability of alternative prey, wetland condition, and seasonal variation in fish size and abundance.

Unofficial Minutes of the CHS Board Meeting, June 12, 2009

The meeting was called to order at 7:38 P.M. at the Schaumburg Public Library. Board members Dan Bavirsha, Deb Krohn, Andy Malawy, Linda Malawy and Brad Trost were absent.

Officers' Reports

Recording Secretary: Cindy Rampacek read the minutes of the May 15 board meeting to the board. Minor corrections were made, and the minutes were accepted.

Treasurer: In Andy Malawy's absence, John Archer presented the May financial reports and no questions were raised.

Membership Secretary: Mike Dloogatch reported that there would be an increase in members as of the June mailing. Non-renewed memberships were shared

Publications Secretary: Aaron LaForge is working on the malware problem on the forum. He is looking for outside help with the issue. The PayPal donation button is on the website; the membership form will be online before June general meeting. The symposium announcement is waiting for more information. The vet list should also be up on the site very soon.

Sergeant-at-arms: In Dan Bavirsha's absence, John reported that 75 were in attendance at the May 27 general meeting.

Committee Reports

Shows:

- Cosley Zoo, June 20
- Argonne National Laboratory annual picnic, changed to July 18.
- Central Stickney Park District, August 16, Noon until 11 P.M., will be coordinated by Nick D'Andrea.
- Reavis High School, August 22.

Adoptions: Little Red Schoolhouse Nature Center is looking for a bullsnake and softshell turtles.

Old Business

Symposium 2009: Two more speakers are lined up, Jeff Lemm and Bob Henderson. Attendees will receive a coupon for \$5.00 admission to NARBC. Cindy Rampacek made a motion that Jason Hood be authorized to purchase 50 symposium T-shirts from EcoWear. Jenny Vollman seconded and the motion passed unanimously. At the Friday night icebreaker, Steve Barten and Mike Pingleton will be showing photos.

Comcast local cable TV show: The first date we had passed by the time we received notice, so we will wait for the next time.

Business cards: John Archer has more "Invitation to a Meeting" cards available.

Media seminar: Prices went up on the media seminar and it wasn't geared towards nonprofits so we will keep an eye on things for future offerings.

New Business

Our July speaker, Kate Jackson, wrote a book, *Mean and Lowly Things*, about her time in the Congo. Mike Dloogatch moved

that we purchase 12 copies of this book from Harvard University Press for sale at the meeting. Jenny seconded the motion and it passed unanimously.

Jenny Vollman suggested that there is a problem with small mammals being brought into our meetings. The discussion expanded to cover many violations of common sense and common courtesy at the meetings. We will draft a "CHS Meeting Etiquette." The board was in general agreement that small mammals should not be brought to the CHS general meetings and that any animals should be properly contained at all times, but especially during the speaker's program.

Nathan Aaberg, of the Liberty Prairie Conservancy is working with Dr. Corn on the foxsnake house. He wrote us a thank-you letter for the CHS donation.

Round Table

Mike Dloogatch informed the board that past CHS president Lori King and Charlie Painter will be getting married soon. Lori sent a bunch of photos she had taken recently in India. While there she met someone who works with Rom Whitaker and is starting up ecotours that will visit the Agumbe Research Station in the Western Ghats and the Madras Crocodile Bank Trust. Lori sent along some brochures for the ecotour.

Mike Scott suggested that people could also bring herp art as well as just animals for folks to view at the general meetings. He thinks it would be cool. . . . Possibly a herp art show?

Rene Rivera suggested that the new etiquette rules be brought up at the Show and Tell meeting.

Aaron mentioned that the August issue of *Reptiles* has two paintings by CHS Member Jessica Tschampa.

Jason recommended we check the Field Herp Forum for a guy posting as Moloch who has amazing pics of Aussie geckos.

Bob Bavirsha is speaking for the Central Illinois Herp Society in Peoria on July 2.

Dick Buchholz wondered if there was a field trip planned this year and there was a discussion. Mike had several suggestions.

John Archer thinks the Top Hat cricket deal is great.

The meeting adjourned at 9:14 P.M.

Respectfully submitted by recording secretary Cindy Rampacek



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For sale: Rats—live or frozen. I breed rats for my collection of boas so only top quality lab chow and care will do, I'm now offering surplus animals for sale. Located in far south suburbs of Chicago. Only orders of 20 or more please, no large rats will be available. For current availability and prices, please e-mail Steve at smuys@sbcglobal.net.

For sale: publications. *Australian Geographic*—the journal of the Australian Geographic Society; each 128- to 141-page issue contains a half dozen feature articles on mainly Australian subjects. The articles are written by authorities and are handsomely illustrated with excellent color photos. Also contain book reviews, notes, and ads of interest to people who like things Australian. Each issue has a map and/or DVD, which are missing in the ones following. \$19 per issue. Jan.–March, 2003 - 10 pp. on forest dragons (*Hypsilurus*); Royal National Park; Adelaide-Darwin railway. Jan.–March, 1988 - 20-page article on Australia's two species of crocodiles and an article on famous fossil site, Riversleigh, by noted paleontologist Michael Archer. July–Sept., 2000 - 18-page article on geckos by Steve Wilson of the Queensland Museum; Murray River. April–June, 1997 - 12 pp. on the red-bellied black snake by Rick Shine; expedition to Mt. Mulligan in north Queensland. *A Natural History of Australia* by Tim M. Berra, 1998, 304 pp., over 200 excellent color photos, 200 line drawings, tables, 38 pp. on herps, Berra is professor emeritus of zoology at Ohio State; this book is the result of 5 years driving over 100,000 miles in Australia; covers vertebrates, invertebrates, plants, culture, geography, DJ, (h), \$75; *Australian Wildlife Series—Australian Snakes and Lizards*, 1981, 51 pp., many good color photos, covers all 5 of Australia's lizard families plus snakes, including the taipan and death adder, (h), \$22; *Australian Snakes, Crocodiles, Tortoises, Turtles, Lizards* by Eric Worrell, 1967 (1966), 64 pp., many b&w and color photos, photo of Worrell milking a taipan on page 52, (h), \$22. (h) = hardbound. All books in excellent condition and are subject to prior sale. \$3 postage and handling for orders \$25 and under; free for orders over \$25. William R. Turner, 7395 S. Downing Circle W., Centennial, CO 80122; telephone (303) 795-5128; e-mail: toursbyturner@aol.com.

For sale: SSAR *Journal of Herpetology*, complete for years 1974 thru present, excellent condition, 142 total issues, \$150; SSAR *Herpetological Review*, complete for years 1977 thru present, excellent condition, 130 total issues, \$125; *Bull. Chicago Herp. Soc.*, 1970 thru present, excellent condition, \$75. All three for \$250. Tom Zarembo, (608) 427-3864 (no email). [Camp Douglas, WI]

For sale: NEODESHA CAGES, never used, six 36" and six 48". The 36" have a single plate glass sliding front which measures 36 1/4" × 18 1/8", two top vents each (externally) 7" × 4 1/4", (internally) 6" × 3" with 1/8" × 1/8" mesh screens. Overall dimensions are 36 1/4" W × 19" H × 18 1/2". The 48" each have two sliding plate glass front sections sliding within aluminum glides. Each glass measures 21" H × 25" W. Each cage has two top vents, measured (externally) 7" × 4 1/4", (internally) 6" × 3" with 1/8" × 1/8" screens. Overall dimensions are 48" W × 22" H × 22" D. I need the space. My asking price is a little over half of what I paid for them. Asking, for the 36" \$60.00 ea. or best offer by August 15, for the 48" \$100.00 ea. or best offer by August 15. Ben Entwisle, Entwisleassoc@aol.com, (R) 815-838-2871, (O) 815-838-1200, (C) 825-685-2740.

For sale: Trophy quality jungle carpet, diamond-jungle, and jaguar carpet pythons. Website: moreliapython.googlepages.com E-mail: junglejohn@tds.net

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Line ads in this publication are run free for CHS members — \$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to: Michael Dloogatch, 6048 N. Lawndale Avenue, Chicago IL 60659, (773) 588-0728 evening telephone, (312) 782-2868 fax, E-mail: MADadder0@aol.com

UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, July 29, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **Dr. Kate Jackson**, an assistant professor of biology at Whitman College in Walla Walla, Washington, and author of *Mean and Lowly Things: Snakes, Science and Survival in the Congo* will be our speaker. The title of Dr. Jackson's PowerPoint presentation is the same as the title of her book.. In her own words from the prologue to the book: "...this is the story of what went into producing a brief report of a survey of amphibians and reptiles, for publication in a scientific journal; the bureaucratic frustrations, disgusting food, parasites, diseases, linguistic confusion, complicated personalities, civil war, isolation, miserable living conditions, cultural misunderstandings, fear, danger, narrow escapes and also great kindnesses. In short, all the things they didn't prepare me for in graduate school at Harvard." We will be selling copies of *Mean and Lowly Things* for \$20 at the meeting and Dr Jackson will be happy to sign them for you. If Dr. Jackson's brand new children's book, *Katie of the Sonoran Desert*, becomes available by the date of the meeting, we will also offer those for sale.

At the August 26 meeting **Dr. Mark Mitchell** will speak on UV for snakes and turtles. Dr. Mitchell is an associate professor in veterinary clinical medicine at University of Illinois, Urbana-Champaign, and teaches classes involving zoo and wildlife medicine..

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

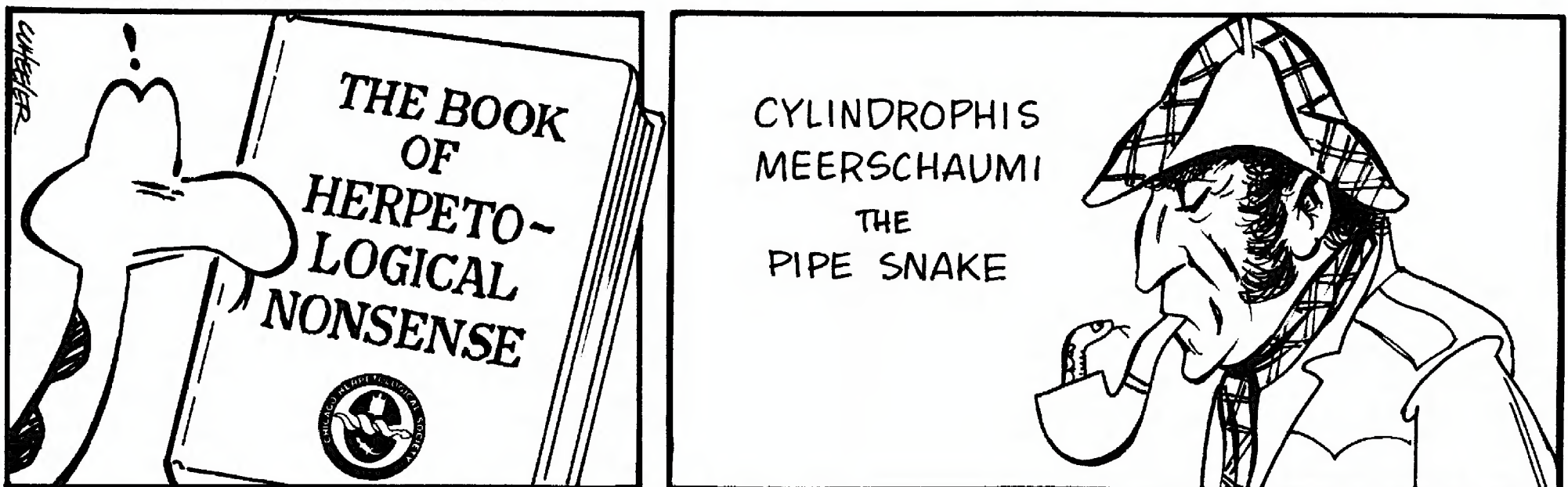
Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., August 14, in the adult meeting room on the second floor of the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the CTC website: <http://www.geocities.com/~chicagoturtle>.

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